## REMARKS

Claims 1-55 stand pending in the instant application. The examiner rejects claims 1, 15-29, 40, and 47, and objects to claims 2-4, 30-39, 4-46, and 48-55 as being allowable but for their dependence on rejected base claims. Applicants appreciate the indication of allowable subject matter but strongly disagree with the reasoning used by the examiner in forming his rejection arguments.

First, the examiner rejects independent claims 1 and 40 (and dependent claim 47) as being anticipated by U.S. Pat. No. 5,708,376 to Ikeda. As the examiner knows, a prior art reference anticipates the claim in question only if every element of the claimed invention is identically shown in the reference in the same arrangement as claimed. In re Bond, 910 F.2d 931, 15 USPQ2d 1566 (Fed. Cir. 1990). Of course, a reference may expressly or inherently disclose the claimed invention. Rowe v. Dror, 112 F.3d 473, 42 USPQ2d 1550 (Fed. Cir. 1997). Whether the reference inherently discloses a feature of the claimed invention is a factual question. To that end, evidence may be introduced on the factual issue of whether a claim limitation is inherent in a prior art reference. Continental Can Co. USA v. Monsanto Co., 948 F.2d 1264, 20 USPQ2d 1746 (Fed.Cir.1991).

Put simply, Ikeda at a minimum must disclose each and every limitation of independent claims 1 and 40, either explicitly or inherently, or it cannot stand as an anticipating reference. Both claims 1 and 40 include limitations relating to a multi-stage amplifier, wherein a first current-mode feedback signal is fed back from the output of an initial stage to a feedback input of the initial stage, and a second current-mode feedback signal is fed back from the output of a final stage to the feedback input of the initial stage. The use of the current feedback, not the more conventional voltage-mode feedback, is key to proper feedback signal combining. For convenience, one may refer to the instant specification at paragraphs 19-24 for a detailed discussion of current-mode feedback and current-mode feedback signal combining.

Thus, to anticipate claims 1 or 40, Ikeda must explicitly or inherently disclose the claimed multi-stage amplifier arrangement, including the claimed first and second current-mode feedback signals. Because an electronic word search of Ikeda reveals that it does not use the word "current" even a single time, and because Applicants' thorough word-for-word and line-by-line reading of Ikeda reveals that its technical discussion of feedback is cast in terms of voltage-mode signals, it is beyond argument that Ikeda offers no explicit teachings relevant to Applicants' claimed current-mode feedback.

With no explicit teachings on current-mode feedback, Ikeda cannot be a legally valid anticipating reference unless Applicants' claimed current-mode feedback limitations are inherent in Ikeda. The examiner's rejection arguments recognize as much. For example, the examiner's anticipation arguments state that "[t]he capacitor elements 5 and 13 of the Ikeda reference must also produce a 'current-mode' signal as meant by applicant for there is a discrete resistance in line with these capacitors 5 and 13 forming the same type of feedback path that applicant refers to as producing a 'current-mode' signal." Effectively, the examiner's argument is that Ikeda teaches the use of current-mode feedback within the meaning of Applicants' claims because Ikeda teaches the use of feedback circuit elements, e.g., resistors and capacitors, similar to those illustrated and described by the instant application.

The examiner's argument is erroneous; the use of resistors and/or capacitors in a feedback loop does not determine whether the feedback signal itself is a current-mode signal or a voltage-mode signal. All electrical signals have both voltage and current components, as formulated in the well known Ohm's Law ($V = IR$), where "V" equal voltage, "I" equals current, and "R" equals resistance. (Note that a more general version of Ohm's Law uses "Z" for reactive impedance, rather than "R," which generally connotes only real-valued resistance.)

Instead, a signal is regarded as a voltage-mode signal if its voltage component represents the controlled (or controlling) parameter and a signal is regarded as a current-mode signal if its current component represents the controlled (or controlling) parameter. In

Applicants' claimed multi-stage amplifier, the current components of the initial and final stage feedback signals are controlling and, therefore, these signals are denoted as "current-mode feedback signals." See, for example, the instant application at paragraphs 25 and 26 (and Fig. 1), which detail the current-mode gain equations for Applicants' multi-stage amplifier, and which specify the exemplary use of a Current Feedback Amplifier (CFA) as the initial stage of Applicants' multi-stage amplifier. Use of a CFA as the initial stage of the claimed multi-stage amplifier, or the equivalent use of a transconductance node on the feedback input of the initial stage, make the claimed multi-stage amplifier explicitly responsive to the current components of the first and second feedback signals, which is not taught by or inherent in Ikeda.

For example, the disclosure of Ikeda states that its Fig. 1 is representative of the variable gain amplifier configuration claimed by Ikeda—see Ikeda at col. 5, lines 66-67. Fig. 1 of Ikeda discloses a first amplifier 14 that has its inverting node coupled to its output through a feedback capacitor 5 and to ground through a shunt capacitor 4, and coupled to the output of a second amplifier 11 through a feedback capacitor 13. Further, a switch 6 directly connects the first amplifier's output to its inverting input, and a switch 10 performs the same function of the second amplifier.

Ikeda explains its two-amplifier arrangement at col. 6, lines 10-42, and explicitly describes its first amplifier 14 as receiving voltage-mode feedback on its inverting input. See Ikeda at col. 6, lines 19-20, which specifically call out that the feedback signal on the inverting input is a "voltage input." This sentence alone rebuts any argument by the examiner that Ikeda somehow inherently teaches the use of dual-loop current mode feedback as detailed and claimed by Applicants. Also, see Ikeda at col. 6, lines 46-67, wherein, in the context of Fig. 7, Ikeda explains the relationship between the output and input voltages of Ikeda's cascaded variable-gain amplifier. For example, at col. 6, lines 50-54 and lines 59-61, Ikeda specifically discusses the input voltages at the inverting and non-inverting inputs of Ikeda's first amplifier.

It is abundantly clear from Ikeda's discussion of signals, and Ikeda's general technical context of variable-gain amplifiers, that Ikeda's disclosure explicitly addresses voltage-mode feedback operations and it is improper to suggest that Ikeda teaches Applicants' claimed multi-stage amplifier with dual current feedback loops. Ikeda specifically describes and illustrates a variable-cascaded amplifier that uses voltage-mode feedback and it is legal error for the examiner to construct an anticipation rejection of claims 1 and 40 based on Ikeda. Respectfully, the anticipation rejections should be withdrawn, and Applicants look forward to the examiner's further actions on this point.

Similarly, the examiner's obviousness rejections of claims 15-18 and 21-23 over Ikeda suffer from the same technical errors as the anticipation rejections. As such, Applicants respectfully request that these rejections also be withdrawn.

Additionally, the examiner rejects claim 24 as obvious over the combination of U.S. Pat. No. 5,737,697 to Yamada with Ikeda. The essential thrust of this rejection is that Yamada teaches a variable gain amplifier for use in a radio base station but with no description of its details, and that Ikeda provides applicable details for a multi-stage amplifier meeting the limitations of the dual current-mode feedback loops included in claim 24. Because Yamada is silent on amplifier details, and because Ikeda explicitly teaches voltage-mode amplifier feedback as explained above, the argued-for combination of Yamada and Ikeda fails to teach the invention of claim 24, and the rejection should be withdrawn.

Finally, the examiner rejects claims 19, 20, and 24-29 as obvious over the combination of U.S. Pat. No. 5,936,464 to Grondahl with Ikeda. As with the Yamada-based obviousness rejection, Grondahl discloses no amplifier details and the examiner relies on the details of Ikeda to formulate his arguments. Therefore, as with the Yamada-based rejection, the Grondahl rejection suffers from the same shortcomings inherent in Ikeda. Namely, Ikeda does not teach Applicants' claimed dual current-mode feedback loops.

Thus, while Applicants note with appreciation that the examiner indicates significant allowable subject matter, it is believed that all claims patentably define over the cited references and reconsideration by the examiner is requested.

Respectfully submitted,
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